2003 King County Residential Food Scrap Collection Final Report

King County
Department of
Natural Resources and Parks
Solid Waste Division

2003 King County Residential Food Scrap Collection Final Report

King County
Department of
Natural Resources and Parks
Solid Waste Division
King Street Center, Suite 701
201 S. Jackson St.
Seattle, WA 98104-3855

This material will be provided in alternate formats upon request.

Printed on recycled paper

2003 King County Residential Food Scrap Collection Final Report

Table of Contents

Introduction

King County and the Cities of Issaquah, Kirkland, Lake Forest Park and Redmond initiated residential organics pilots in April and May 2002. The pilots in each city were based on combining food scraps (including meats and dairy products) and food-soiled paper such as paper napkins, towels and pizza boxes into existing yard debris collection cans and carts. The pilots in various cities differed slightly in the style of containers used (cans versus carts), frequency of collection and the contracted collection company. The 2002-2003 pilots are detailed in the March 2003 *King County Residential Food waste Collection Pilots Interim Report (body of report is attached as Appendix A).*

The pilots were initially designed for a 12-month period in order to capture data on seasonal generation. In early 2003, however, King County, the Cities, the Seattle-King County Health Department, the haulers (Rabanco Ltd. and Waste Management, Inc.) and Cedar Grove Composting agreed to continue the pilots. No changes were made to the weekly collection pilots in Issaquah, Kirkland and Redmond, but in Lake Forest Park a substantial schedule change and expansion was made. This report covers only the activities during the second year of the pilot. For information on the original pilot rationale, implementation, and first year data please refer to the March 2003 report.

Pilot Design

Overview

All four city pilots provided weekly collection of organics in the second year of the pilot. No new cities were added to the pilot program, and pilot route sizes remained constant, with the exception of Lake Forest Park (as described below.) All collected material was delivered to Cedar Grove Composting. The mixed organics were charged the same tipping fee as straight yard debris. The composting process remained mostly the same as described in the March 2003 Interim Report, although toward the end of the second year of the pilot, Cedar Grove Composting operated their own composting pilot based on the use of the Gore Cover In-Vessel System. The technology has now been adopted by Cedar Grove Composting, with a plan to convert the entire facility to the Gore Cover In-Vessel technology. In addition, Cedar Grove Composting received its permit to accept residential food waste as a feedstock for its composting operations.

Issaquah

The Issaquah pilot was continued for the second year with minimal changes. The weekly collection frequency and route size of approximately 440 households remained constant. During this time period, the City of Issaquah and Rabanco Ltd., the collection contractor, renegotiated their collection contract to include the use of carts for yard debris throughout the City. Previously, most customers had relied on customer-provided cans for yard debris collection. This citywide shift to carts included the pilot area.

Kirkland

The Kirkland pilot was continued for the second year with no changes. The weekly collection frequency and route size of approximately 225 households remained constant. Halfway through the second year of the pilot, Kirkland implemented its new solid waste collection contract. This included expanding the food waste collection pilot citywide to 10,300 households on December 1, 2003. The citywide organics collection is consistent with the pilot design, and is based on weekly year-round collection and the provision of kitchen containers to all households.

Redmond

The Redmond pilot was continued for the second year with no changes. The weekly collection frequency and route size of approximately 715 households remained constant. At the end of the second year of the pilot, Redmond implemented its new solid waste collection contract, which included an expansion of the pilot to full-scale citywide implementation to 9,500 households on March 1, 2004. The citywide organics program is consistent with the pilot design, and is based on the universal provision of kitchen containers. Collection is weekly nine months of the year and every-other-week during the winter months. If this is not acceptable to either the Health Department or residents, the City has the contract option of switching to weekly year-round collection for a $0.39 per household monthly increase in residential rates. This decision will be made later in Fall 2004.

Lake Forest Park

The collection schedule during the first year of the Lake Forest Park pilot featured every-other-week/alternating garbage and organics collection. For example, garbage was collected one week, organics the next week, then garbage again the following week. Aerated carts were provided to reduce the possibility of odorous anaerobic decomposition in the carts. This approach is used in a number of Canadian communities to reduce the financial and environmental costs of running multiple trucks to collect different waste streams from residents. While this initial approach yielded high participation, a number of residents found it confusing and inconvenient, and were uncomfortable with less-than-weekly collection.

For the second year, the pilot was expanded to cover an entire route of 625 households and organics collection frequency was shifted from every-other-week to weekly. Every-other-week garbage collection was retained for the entire pilot area, and all customers were provided with carts equivalent in capacity to their previous weekly garbage subscription level (e.g. a 32 gallon weekly can customer was provided a 64 gallon cart for every-other-week collection). Carts were provided to test the operational efficiencies of automated collection of garbage and organics.

Promotion and Education

No major new promotion initiatives were implemented during the second year of the pilot. Residents were provided with a quarterly thematic postcard (Appendix B) as a reminder of the program. In addition, hauler customer service staff provided orientation to incoming residents in the pilot area, and referred those with specific questions to the project hotline.

The low promotion profile was intended to mirror the level of promotion that might be expected under full-scale implementation after the initial surge in participation at program initiation. Thus, the diversion levels would likely reflect a mature program, and would provide a basis for estimating the longer term diversion impacts once citywide programs are developed.

Hotline use tapered off dramatically after the transition in Lake Forest Park was completed in June. During 2003, 162 calls were received from a total pilot customer base of approximately 2,000 households. The majority of these calls were from the Lake Forest Park pilot area during the implementation period. Relatively few calls were received from the weekly pilot areas. Some calls were questions from residents outside of the pilot area requesting information on home composting or asking when food scrap collection would be available in their areas.

Residents had multiple ways of obtaining pilot information, ranging from the hotline, King County's website, hauler customer service representatives and city solid waste coordinators.

Monitoring and Evaluation

Overview

One of the key objectives of the second year of the pilot was to obtain better diversion estimates than those provided through hauler route data. While useful, the route data are not consistent due to continuing changes in routing. These changes are made necessary for efficient operations, and to cover day-to-day changes in operations due to vehicle breakdown or other circumstances. To counter this introduced variability, a can weight study was conducted in each of the four seasons during the second year of the pilot. This study involved weighing individual garbage and organics containers in a pilot and non-pilot area of Lake Forest Park and Redmond, as detailed in the following sections.

Reported Route Data

The haulers tracked route data for each of the pilot routes in their respective contract cities. The pilot route data was compared with the citywide averages for non-pilot areas to determine the impact of the pilots. Table 1 provides a summary of the results for each of the four pilot cities. April-December data is shown for three years: 2001, the year *before* the pilots; 2002, the first year of the pilot; and 2003, the second year of the pilot.

As can be seen from the table, a wide variation in route data was reported. Kirkland, Issaquah and Redmond all have weekly yard debris/organics and weekly garbage collection, and all provide yard debris collection as part of their basic service package. All three cities are suburban cities on the east side of Lake Washington with roughly similar demographics. In spite of the consistencies between those three cities, the inferred food scraps component varies widely between the first and second year of the pilot. In particular, it appears that Kirkland's food scraps quantities may have stayed roughly the same, Issaquah's food scraps quantities declined from 12.0 to 4.1 pounds per household per month, and Redmond's food scraps recovery increased from 11.8 to 31.0 pounds per household per month.

Lake Forest Park's pilot data appear to be more consistent, though the difference in garbage and yard debris between pilot and non-pilot routes is more pronounced. Unlike the three weekly cities described above, Lake Forest Park's pilot area was more than doubled in the second year of the pilot. In addition, the organics collection schedule changed from every-other-week during the first year of the pilot to weekly during the second year of the pilot. The non-pilot areas in Lake Forest Park have every-other-week yard debris collection and weekly garbage collection.

These data variations may be attributable to route or reporting irregularities. Although both Rabanco Ltd. and Waste Management, Inc. were very helpful with the pilot, route boundaries were shifted as needed during the two years of the pilots. Vehicles were also shifted between routes when operationally required in cases of breakdown or heavy collection volumes. In these cases, some pilot route households may have been collected by other route trucks (or vise versa), which skewed route quantities reported for that day. As a result, the reported route data does not indicate any clear trends on which to draw clear conclusions.

The city-specific route data from which Table 1 is derived is provided as Attachment C.

Table 1
Generation Data from Pilot Cities
(pounds per household per month)

	April-December 2001		**April-December 2002**		**April-December 2003**	
KIRKLAND	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**
Garbage	163.6	175.0	146.1	146.2	158.7	142.9
Yard Debris	109.4	185.5	122.1	134.2	123.2	135.4
Food scraps	0	0	0	?	0	11.6
ISSAQUAH	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**
Garbage	103.4	91.0	122.4	86.2	113.6	101.3
Yard Debris	93.8	72.7	86.1	78.7	113.7	98.1
Food scraps	0	0	0	12.0	0	4.1
REDMOND	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**
Garbage	140.2	135.5	134.3	119.5	128.0	120.4
Yard Debris	119.8	127.9	127.2	135.9	116.0	123.9
Food scraps	0	0	0	11.8	0	31.0
LAKE FOREST PARK	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**
Garbage	117.8	118.7	116.6	99.7	117.6	125.0
Yard Debris	64.5	43.1	78.0	52.2	109.0	73.0
Food scraps	0	0	0	31.1	0	34.5

Can Weight Study

In 2003, a can weight study was conducted once each quarter to measure actual set-out weights of both garbage and organics carts in two cities, Redmond and Lake Forest Park. In each city, a pilot and non-pilot test area was selected, each with a target sample size of 50 single 32-gallon garbage can customers. The fifty household weighing area target was determined to be the minimum reasonable sample size that could be weighed within a 2-3 hour window where both garbage and yard debris containers were set out, but not yet collected. The test area selection was very constrained, since there were relatively few areas where neither garbage nor organics were collected until late morning. Although an effort was made to match the yard sizes and demographics of pilot and non-pilot areas in each city, the need to weigh the samples within the time window before collection of either organics or garbage led to compromises between sample size and household similarity. Table 2 reports the results of this study.

Table 2
Four Season 2003 Household Set-Out Weights
(average pounds per household per month)

	Feb/Mar 2003 Samples		May/Jun 2003 Samples		August 2003 Samples		Oct/Nov 2003 Samples		Four Season Average	
	Pilot	Non-Pilot	Pilot	Non-Pilot	Pilot	Non-Pilot	Pilot	Non-Pilot	Pilot	Non-Pilot
Redmond										
Garbage	84.9	84.6	97.2	100.2	89.0	101.4	90.8	110.9	90.5	99.3
Yard Debris		22.2		195.6		52.7		130.2		100.2
Organics	90.3		265.9		52.6		79.6		122.1	
Total	**175.2**	**106.9**	**363.1**	**295.8**	**141.6**	**154.1**	**170.4**	**241.1**	**212.6**	**199.5**
Diversion Rate	**51.5%**	**20.8%**	**73.2%**	**66.1%**	**37.1%**	**34.2%**	**46.7%**	**54.0%**	**57.4%**	**50.2%**
Effective Sample Size	50	30	51	54	46	57	50	55		
Lake Forest Park										
Garbage	55.3	77.2	57.8	80.7	63.2	80.3	88.0	77.2	66.1	78.9
Yard Debris		26.7		139.4		61.3		126.7		88.5
Organics	47.5		84.0		41.9		77.9		62.8	
Total	**102.8**	**103.9**	**141.8**	**220.1**	**105.1**	**141.6**	**165.9**	**203.9**	**128.9**	**167.4**
Diversion Rate	**46.2%**	**25.7%**	**59.2%**	**63.3%**	**39.8%**	**43.3%**	**46.9%**	**62.1%**	**48.7%**	**52.9%**
Effective Sample Size	39	47	47	48	49	44	43	40		

Note: In Table 2 the diversion rate is the average organics or yard debris set out divided by the average for garbage plus organics or yard debris set outs. It is not the typical diversion rate that would also include recyclables set outs in both the numerator and denominator of the diversion rate calculation.

Two of the results from weighing household set outs are worth noting:

- Based on lower four-season-average garbage set outs in both cities for pilot versus non-pilot routes, the pilot collections most likely are diverting organics that otherwise would be thrown in the garbage in both cities.

- The four-season-average organics diversion rate for the pilot route in Redmond is higher than the yard debris diversion rate for non-pilot routes. However, for Lake Forest Park the non-pilot diversion rate is higher than for the pilot route. The reason for this anomaly appears to be that the Lake Forest Park non-pilot route has more yard debris generators that produce large quantities of yard debris than the pilot route has large quantity organics generators.

The non-pilot routes in Redmond and Lake Forest Park were not selected according to a rigorous sampling design that would assure similar yard and garden sizes, similar household sizes, and similar income levels in both cities for pilot and non-pilot routes. Thus, systematic differences between the two cities and/or between pilot and non-pilot routes in each city in any of these important demographic/geographic drivers of waste generation could cause variations in organics and yard debris generation rates that have little to do with whether the household has organics collection or not.

Table 3 indicates how significant some of these non-controlled variables must be and how differently they likely are distributed over the four routes. The table shows the distribution of large set-out weights for organics and yard debris for each of the four routes, where "large set-out weight" means that a household set out a total of 200 or more pounds of organics or yard debris in one or more of the four weighing seasons.

Table 3
Distribution of Large Set-Out Weights for Organics or Yard Debris

	Redmond		Lake Forest Park	
	Pilot	**Non-Pilot**	**Pilot**	**Non-Pilot**
Percent of Households with Large Weights				
In 1 of the 4 seasons	37.7%	33.9%	11.8%	17.7%
In 2 of the 4 seasons	7.6%	13.6%	3.9%	7.8%
In 3 of the 4 seasons	3.8%	0.0%	0.0%	3.9%
In 4 of the 4 seasons	0.0%	0.0%	0.0%	0.0%
Total	**49.1%**	**47.5%**	**15.7%**	**29.4%**
Count of Households with Large Weights				
In 1 of the 4 seasons	20	20	6	9
In 2 of the 4 seasons	4	8	2	4
In 3 of the 4 seasons	2	0	0	2
In 4 of the 4 seasons	0	0	0	0
Total	**26**	**28**	**8**	**15**
Total Households on Route	53	59	51	51

As indicated in Table 3, the pilot and non-pilot routes in Redmond have similar distributions for large organics and yard debris set-outs. However, the Lake Forest Park non-pilot route has nearly twice as many large set-out households as the pilot route.

To see what the effect of having similar numbers of large set outs would be for the four-season weighing results in Lake Forest Park, we deleted weighings for seven of the large

non-pilot yard debris set-out households and recomputed the table of four season weighing results. The households we deleted were the two that had large weights in three of the four seasons, every other one of the households that had large weights in two of the four seasons, and every third household that had exactly one instance of a large weight. This yielded a non-pilot sample route with the same number of large set-out weight households as the pilot route had. Table 4 shows these results. Interestingly, this adjustment yields diversion results for Lake Forest Park that are much more consistent with diversion results for Redmond. That is, the pilot route organics diversion rate exceeds the non-pilot route yard debris diversion rate by about seven percentage points in both Redmond and Lake Forest Park.

In addition, the four-season-average monthly set-out weights for organics on pilot routes are larger than are the averages for yard debris set outs on non-pilot routes, although the differential for Lake Forest Park is 5.1 pounds compared with 21.9 pounds for Redmond. Finally, the pilot route garbage set-out averages are both smaller than the non-pilot averages. In this case the Redmond and Lake Forest Park differences are more similar, amounting to 8.8 pounds and 13.5 pounds, respectively, of lower monthly garbage set-out weights on the pilot routes.

Table 4
Four Season 2003 Household Set-Out Weights (LFP non-pilot adjusted)
(average pounds per household per month)

	Feb/Mar 2003 Samples		May/Jun 2003 Samples		August 2003 Samples		Oct/Nov 2003 Samples		Four Season Average	
	Pilot	Non-Pilot	Pilot	Non-Pilot	Pilot	Non-Pilot	Pilot	Non-Pilot	Pilot	Non-Pilot
Redmond										
Garbage	84.9	84.6	97.2	100.2	89.0	101.4	90.8	110.9	90.5	99.3
Yard Debris		22.2		195.6		52.7		130.2		100.2
Organics	90.3		265.9		52.6		79.6		122.1	
Total	**175.2**	**106.9**	**363.1**	**295.8**	**141.6**	**154.1**	**170.4**	**241.1**	**212.6**	**199.5**
Diversion Rate	**51.5%**	**20.8%**	**73.2%**	**66.1%**	**37.1%**	**34.2%**	**46.7%**	**54.0%**	**57.4%**	**50.2%**
Effective Sample Size	50	30	51	54	46	57	50	55		
Lake Forest Park										
Garbage	55.3	77.0	57.8	78.3	63.2	84.9	88.0	78.2	66.1	79.6
Yard Debris		14.5		98.4		40.5		77.3		57.7
Organics	47.5		84.0		41.9		77.9		62.8	
Total	**102.8**	**91.5**	**141.8**	**176.7**	**105.1**	**125.5**	**165.9**	**155.5**	**128.9**	**137.3**
Diversion Rate	**46.2%**	**15.8%**	**59.2%**	**55.7%**	**39.8%**	**32.3%**	**46.9%**	**49.7%**	**48.7%**	**42.0%**
Effective Sample Size	39	41	47	42	49	36	43	40		

The data in Tables 2 and 4 are based on weighing household set outs during four consecutive weeks in each season, with four week total set-out weights multiplied by the factor 52/48 to provide estimates for monthly set out weights. The effective sample sizes noted in Table 2 indicate the number of households for which we successfully weighed garbage and organics or yard debris set outs during four consecutive weeks. There were three main reasons for excluding households on pilot or non-pilot routes from the sample averages shown in Table 2.

(1) Households with missing set out weights: During the late winter season we missed weighing a number of household set outs on the Lake Forest Park pilot route and the Redmond non-pilot route due to set outs being emptied into collection vehicles before they could be weighed. This problem was remedied for subsequent seasons by selecting a non-pilot route neighborhood in Redmond whose collection day is not the same as the Lake Forest Park pilot route's collection day. However, for the late fall season for Lake Forest Park we missed weighing organics set outs on November 19 and yard debris on November 20. One of these was due to inclement weather and the other to a new driver starting the sample part of the route first rather than leaving it to last. Rather than throw out the whole season of weighings for Lake Forest Park we assumed that the missed organics week would have been equal to the average of the first three weeks. We also assumed that the missed yard debris collection week would have been equal to the one yard debris collection week that we did successfully weigh for the Lake Forest Park non-pilot route.

(2) Households with obvious errors in set out weights: An example of this type of error is a recorded set out weight that is less than the empty container weight for the container used for the set out.

(3) Households that switched to a higher service level at some point during the year: An example of this is households that switched from weekly collection of garbage from a single 32-gallon can to weekly collection from a 64- or 96-gallon cart.

Participation Monitoring

One ride-along participation count was conducted during the pilot. The count was performed in Lake Forest Park on October 8, 2003. The purpose of the count was to visually inspect the organics mix at each stop and determine the number of yard debris container set out, and the number of those containing either or both soiled paper and food scraps.

Out of the 641 customers that day, 320 set out their organics container equaling 50% of the total potential set outs. It is important to note that this was during the "shoulder" season of yard debris generation, so not all garbage customers likely needed to set out their yard debris container. 87 of the 320 customers (27%) had yard debris carts containing only yard debris, and 233 customers (73%) had yard debris and/or food scraps and soiled paper in their cart.

Table 5
Composition of Material Based on All Organics Carts That Were Set-out.

Item In Cart	Number of households	Percentage of customers that put their cart out
Food only	11	3.4%
Food and paper only	89	27.8%
Paper only	8	2.5%
Paper and yard waste	49	15.3%
Food and yard waste	25	7.8%
Food, paper and yard waste	51	15.9%
Yard waste only	87	27.2%

The following breakdown details the number of customers with food or paper waste in their cart:

Total customers with paper in their cart: 197 (62% of customers with carts out)

Total number of customers with food in their cart: 176 (55% of customers with carts out)

Total number of customers with food and/or paper waste and NO yard debris in their cart: 108 (34% of customers with carts out)

Of customers with food waste or paper waste in their cart, 50% were using the program fully (this was determined by seeing a large amount of food and paper waste in their can); 29% had 5-10 items in their cart and 21% had 1 or 2 items such as a pizza box in their cart.

The Lake Forest Park pilot area consists of the older (2002) section with aerated Compostainer carts and the newer (2003) section with regular non-aerated carts. Participation was compared between the old and new portions of the route. Note that the differences may be due to both longer experience with the pilot rather than the inherent differences in the style of carts:

124 of the 320 set outs were in a Compostainer.

Of Compostainer set outs, 90% had food or paper in the container.

Of regular cart set outs, 62% had food or paper in their container.

Table 6 (next page) provides detail on the observed contents of the two types of carts.

For Compostainers: Of customers with food waste or paper waste in their cart, 65% were using the program fully (this was determined by seeing a large amount of food and paper waste in their can); 22% had 5-10 items in their cart and 13% had 1 or 2 items such as a pizza box in their cart.

For regular carts: Of customers with food waste or paper waste in their cart, 36% were using the program fully (this was determined by seeing a large amount of food and paper waste in their can); 35% had 5-10 items in their cart and 29% had 1 or 2 items such as a pizza box in their cart.

Table 6
Composition of Materials Based on Cart Type.

Item	Compostainer set outs	Regular Cart set outs
Food only	4 (3.2%)	7 (4%)
Food and paper only	58 (46.7%)	31 (16%)
Paper only	2 (1.6%)	6 (3%)
Paper and yard waste	19 (15.3%)	30 (15%)
Food and yard waste	1 (.8%)	24 (12%)
Food, paper and yard waste	28 (22.5%)	23 (12%)
Yard waste only	12 (9.6%)	75 (38%)
Total households	124	196

Outcome and Findings

Outcome

As of April 2004, Kirkland and Redmond have expanded the pilot into a permanent citywide program. Issaquah is considering whether to negotiate or competitively bid their collection contract, but in either case staff is inclined to expand the pilot into a permanent citywide program. Lake Forest Park has requested a range of collection options and costs from their hauler, with the possibility of a long term contract extension which could include citywide weekly organics (and garbage) collection.

In addition, the City of Bellevue, which was *not* part of the pilot program, monitored the progress of the pilots and added food scraps collection into the mix of services offered to their 26,000 single-family households under their new contract, which starts in July 2004. Due to the multiple rounds of bidding, the cost of adding food scraps collection to the existing yard debris program was essentially zero.

Kirkland

The City of Kirkland competitively procured a new collection contract, effective December 1, 2003. The procurement was won by the incumbent hauler, Waste Management. One of the options requested in their Request-for-Proposals was to separately identify the costs of: (1) adding food scraps collection to the existing 9 month weekly/3 month every-other-weekly yard debris collection system; and (2) shifting to a weekly year-round yard debris collection schedule. Waste Management proposed costs of $0.19 and $0.39 per customer per month for food scraps collection and year-round weekly collection. The City determined that the net savings due to the competitive process and the implementation of automated collection balanced the added cost of food scraps collection and decided to add both food scraps and year-round weekly collection to the new collection contract.

Issaquah

The pilot area is continuing to receive food scraps collection as the City negotiates or competitively procures a new collection contract. The City will determine whether to expand the organics collection program citywide, pending on the results of negotiations or a RFP process. If the program is not expanded, the City may elect to continue the pilot or demobilize by instructing residents to no longer place post-consumer food scraps and soiled paper in their yard debris carts.

Lake Forest Park

The pilot area is continuing to receive food scraps collection as the City attempts to successfully negotiate a new collection contract. Based on those negotiations, the City will determine whether to implement a weekly organics collection program citywide. If contract negotiations are not successful, the existing pilot will be demobilized. Garbage collection will be shifted back to a weekly cycle and customers who received oversized carts with two weeks capacity will be shifted back to either their previous cart size or their previous customer-owned garbage can. Yard debris collection will be shifted back to every-other-week and customers unwilling to pay for yard debris cart rental will have their carts removed. Finally, customers will be instructed to cease placing post-consumer food scraps and soiled paper in their yard debris carts.

Redmond

The City of Redmond negotiated a new collection contract with their incumbent hauler, Waste Management, effective March 1, 2004. Redmond used the results of the competitive process in Kirkland (a neighboring city) to negotiate their contract. Waste Management proposed the same costs of $0.19 and $0.39 per customer per month for food scraps collection and year-round weekly collection, respectively. Redmond decided to add food scraps collection, but to retain the 9-month weekly, 3-month every-other-week organics collection schedule, pending Health Department approval. If such approval is not gained or if every-other-week organics collection is determined to be unacceptable, the City has the contract option to have WMI implement weekly collection year round for an additional $0.39 per customer per month at any time during the contract term.

Findings

The 2002 and 2003 pilots were a success with no major operational problems. Specific findings are:

- ***Weekly Collection Is Advisable***: Weekly collection of combined yard debris and food scraps virtually eliminated odor and fly concerns, even during the summer months. It also allowed more level collection volumes without the extreme peaks encountered during Spring and early Summer under less than weekly collection. Every-other-week collection was feasible with aerated carts, but there were still some odor and fruit fly concerns expressed by some residents. The actual incidence of these problems appeared to be low during route audits. However, customer perceptions and a few actual cases lead to the conclusion that weekly collection is more acceptable.

- ***Commingling Increases Collection Efficiencies and Reduces Odors***: Combining yard debris, food scraps and food-soiled paper worked well to reduce odors and contain free liquids. Separate food scraps collection was not attempted in the pilots due to the high economic and environmental costs of separate routes as well as the lack of effective bulking agents for food scraps.

- ***Embedding Yard Debris Collection Maximizes Diversion:*** All pilot cities already had embedded yard debris collection where the service is offered at no additional charge as part of the basic garbage and recycling service. If yard debris collection had not been universal, the route density would have been lower, which would have decreased the opportunity for organics diversion. However, the model of combining food scraps and yard debris together for collection would still have worked well with a subscription based yard debris service, though with fewer potential participants.

- ***Participation:*** The participation "profile" in the pilot programs was significantly different than participation in traditional recycling programs. Food scraps and soiled paper collection is a foreign idea to many residents and thus setting aside those materials for composting collection requires thought and a level of effort above that needed to recycling paper or containers. In addition, the "ick" factor of degrading organics is a barrier for many people, as well as the perception that very little food scrap is available in household garbage for composting. Thus, initial participation rates were expected to be lower than for traditional programs and to require time to gradually increase as acceptance grows. This was the experience of the pilots, with perhaps only 20-30 percent of residents placing one or more acceptable materials in their yard debris carts. A number of participants only placed pizza boxes or pre-consumer materials (e.g. spoiled potatoes, pumpkins) in their containers.

- ***Public Education:*** As discussed above, organics diversion is a new concept for people and will require constant education/reminders. Full-scale implementation should make it easier to reach residents with a consistent method. The quarterly

postcards mailed to residents in the pilot areas during the second year of the pilot were likely insufficient to maintain interest in the program.

- ***Kitchen Containers:*** Kitchen containers are an important part of program identity, though many houses won't use them either because they have alternative containers that fit their constraints better or they don't want to make space for any container. Universal distribution is likely the best way to increase the profile of the program at implementation; however, a return mechanism should be established to recover unwanted containers.

- ***Compostable Kitchen Container Liners:*** None of the pilot area residents were provided compostable liners for their kitchen containers as part of the pilot due to cost and a limited range of supply options. Since the start of pilots, bag costs have decreased and the number of suppliers approved by Cedar Grove Composting has increased. The availability of liners may reduce the reluctance of some residents to separate food scraps. In future programs these should be available for purchase by households, either through the city, the hauler, or a local retail outlet.

- ***Town homes, High Density Single-Family Customers:*** The pilot areas were specifically selected to include only detached single-family residences with embedded yard debris collection services. As cities implement food scraps collection, some thought will need to be given to town homes and similar residents that are provided single-family rather than multifamily services. In many of those cases those residents are charged single-family rates (which include yard debris collection) for their garbage container, although they do not use yard debris collection services. In the interests of equity, those residents should be provided a food scraps recycling opportunity (since they are paying for it), even though they may not have normal amounts of yard debris to bulk out their collection containers. This issue is currently being addressed in Redmond, which has a substantial number of single-family customers in attached dwellings.

APPENDICES

Appendix A

King County

Residential Foodwaste Collection Pilots

Interim Report - March, 2003

Prepared by:
Sound Resource Management Group, Inc.

The following report highlights the findings to date and estimated future diversion potential of Residential Foodwaste Collection from pilot projects within 4 suburban King County cities.

King County Solid Waste Division wishes to thank the following entities for their efforts to date: the pilot cities of Issaquah, Kirkland, Lake Forest Park, and Redmond; the hauling companies Eastside Disposal Inc. and Waste Management Inc.; and the Cedar Grove compost facility.

Josh Marx, Program/Project Manager III
josh.marx@metrokc.gov
(206) 296-4429

Table of Contents:

1. Introduction

In King County, approximately 30-40% of the residential waste stream collected from single-family residences is composed of foodwaste, yard debris, soiled paper and other potentially compostable organic materials. The organics component of the residential waste stream offers the highest diversion potential of the currently disposed waste stream. The diversion of additional organics offers a number of advantages beyond the goal of simply diverting waste from landfills, including: reduced concentration and toxicity of leachate, reduced landfill gas and production of needed beneficial soil amendments.

The King County Solid Waste Division, along with participating cities and haulers has been conducting a pilot organics collection program in four cities since Spring 2002. The pilot objectives are to recover and divert the widest possible range of organic material as is cost-effective, while either minimizing or reducing the overall residential solid waste collection system costs. While a number of organics collection pilots have been performed in Western Washington during the past decade, few if any, have attempted to implement a large-scale pilot program that has the potential of operating sustainably into the future without continuing subsidies. The pilots were designed to be as economically and operationally sustainable as possible.

Each city previously provided yard debris collection at no additional charge, as part of the bundle of services funded through garbage collection fees. Residents in pilot areas were instructed to place all foodwaste, soiled paper and yard debris, combined, in their yard debris collection container. Pilot cities included Kirkland, Issaquah, Lake Forest Park and Redmond. Table 1 summarizes the pilot area, haulers, number of households and the pilot start date.

Table 1 – Pilot Areas

City	Hauler	Pilot Households	Start Date
Kirkland	Waste Management	225	4/1/02
Issaquah	Eastside Disposal/ Rabanco Ltd.	439	4/1/02
Lake Forest Park	Eastside Disposal/ Rabanco Ltd.	296	5/1/02
Redmond	Waste Management	715	4/1/02

Each city had varying yard debris collection configurations, which allowed the testing of organics collection under a variety of implementation scenarios. A Memorandum of Understanding was negotiated between the consultant, each city, each hauler and the County to define respective responsibilities, funding contributions and compensation. A copy of a sample memorandum is provided in Appendix A.

The City of Kirkland previously had the only flat rate residential garbage collection in King County. Under the flat rate system, residents could place up to five cans of garbage out for collection at a single universal rate. Yard debris and recycling collection costs, including containers, were embedded in the flat rate. The flat rate program was shifted to a variable rate system in April 2002, one month before the start of the organics pilot program. The City also

shifted, in March 2002, from a 3-bin recycling system to a cart-based program, with all paper fibers placed in a 64-gallon cart and all containers placed in a 14-gallon bin. These two major changes occurred right before the start of the organics pilot.

The City of Redmond's solid waste collection system remained unchanged, other than to allow residents to place foodwaste and soiled paper in their yard debris carts. The City of Redmond had previously purchased semi-aerated carts for yard debris collection at the time the City started its 1994 collection contract. The semi-aerated carts are essentially a first generation aerated cart and include a bottom shelf and liquid collection sump as well as holes in the top. All residents received a cart under the 1994 contract. Both recycling and yard debris collection are embedded in garbage rates and are provided at no additional charge.

The City of Issaquah's solid waste collection system also remained unchanged, other than to allow residents to place foodwaste and soiled paper in their yard debris container. Unlike the other weekly collection pilot cities, Issaquah customers were not provided yard debris carts as part of the basic service. Although yard debris collection costs were embedded in rates, if customers wanted a wheeled cart, they had to rent it separately. As a result, relatively few customers used wheeled carts, and most relied on a specially marked metal or plastic "garbage can." Thus, the pilot served to test the performance of expanded organics collection in a city with a high percentage of customer-supplied cans.

The City of Lake Forest Park had every-other-week yard debris collection, with collection costs embedded in the garbage rates. Customers were allowed to use either customer-supplied cans or a rented cart from the contractor. The pilot program in the City of Lake Forest Park is significantly different than those in the other cities. Aerated carts were delivered to all households in the pilot area in order to test the feasibility of every-other-week foodwaste collection. At the same time, garbage collection frequency was reduced to every-other-week, allowing a single truck to alternate between garbage and organics collection on successive weeks. This model has been used in eastern Canada to reduce collection costs while simultaneously maximizing diversion. While successful in Canada, this model had not been previously tried in the U.S. and offers the potential to add organics collection at no additional cost in cities and unincorporated areas with existing every-other-week yard debris collection.

The City of Kirkland was the only pilot city with mandatory garbage collection. All other cities have optional garbage collection, although voluntary subscription levels are typically high—about 90%.

Kitchen containers were provided to all pilot cities' residences (except for a small area of Issaquah) either at the start of the program or four months into the pilot period.

Prior to the pilot, both Waste Management and Eastside Disposal delivered collected yard debris to Cedar Grove Composting ("Cedar Grove") in the Maple Valley area in southeastern King County. Yard debris was collected and shipped via transfer station (Woodinville in the case of Waste Management and South Seattle in the case of Eastside Disposal) to the composting facility. Pilot organics, including foodwaste and soiled paper, were also delivered to Cedar Grove for separate composting in the facility's covered "Zone 7" area. The separate handling

required both haulers to bypass their regular transfer systems. In Waste Management's case, both Kirkland and Redmond's pilots picked up on Tuesdays, loaded in the same transfer trailers and delivered directly to Zone 7 at Cedar Grove. In Eastside Disposal's case, route trucks from both Lake Forest Park and Issaquah bypassed the company's transfer facility, and directly hauled and separately unloaded at Cedar Grove's Zone 7.

Table 2 – Containers and Collection Frequency

City	Curbside Containers	Kitchen Containers	Collection Frequency
Kirkland	64- or 96-gallon standard carts (existing)	Provided to all households in August, 2002	Weekly
Issaquah	Some rent carts; most use specially marked customer-owned cans	Provided to most households in August, 2002	Weekly
Lake Forest Park	New aerated 64-gallon Schaefer Compostainers (provided)	Provided to all households at start of pilot program in May, 2002	Every-other-week, alternating with every-other-week garbage collection
Redmond	64-gallon semi-aerated carts (existing)	Provided to all households in August, 2002	Weekly

The collected organics delivered by the haulers are unloaded on a bed of composting "overs" or fresh yardwaste collected that day from other routes to retain any free liquids contained in the mixed organics. The organics are then shredded and placed in an aerated static pile. After initial composting, the materials are moved out of Zone 7 and handled the same as other yard debris materials at the composting facility. It is worth noting that this approach is feasible in part due to the very high percentage of yard debris in the mixed organics. King County cities with embedded weekly yard debris service[1] achieve an average of about 1,200-1,300 pounds of yard debris per household per year. This quantity of yard debris far outweighs the amount of foodwaste and soiled paper available and actually captured in the pilot areas.

This report reviews the status of the on-going pilots after ten months of implementation through the end of 2002. Due to the fundamental differences between the weekly and every-other-week (Lake Forest Park) pilots, each is addressed separately in the following sections.

2. Weekly Pilots

The "weekly pilot" cities were Kirkland, Issaquah and Redmond. All had weekly yard debris collection for nine months of 2002 during the pilot program. Collection schedules in the non-pilot areas of cities were typically reduced to either every-other-week or monthly collection during the mid-winter months. For the duration of the pilots, organics collection were provided weekly throughout the year, including winter months.

[1] *where yard debris collection is offered as part of basic garbage service at no additional charge*

2.1 Implementation

Implementation in each of the weekly cities was very simple. Since the only change to the collection systems was to allow residents to place a wider range of organics in their existing yard debris container, implementation mostly consisted of the initial notification to residents to inform them about the pilot program and how to participate.

Due to the desire to confine the pilot program notification strictly to households within the pilot area, no participation information was directed through media sources. The primary method of contact was through a mailed introductory letter and a brightly colored doorhanger (see Appendix B) delivered throughout the pilot areas during the last week of March, 2002. A food recycling hotline[2], web site and e-mail address[3] were provided to address questions from pilot area residents. Kitchen containers were not initially delivered in the weekly pilot areas, but were later as an attempt to increase participation.

This type of approach relied heavily on the introductory letter and the doorhanger to reach the responsible person within each household and to gain a level of interest and teach what participation in the pilot would mean. It became very apparent during the first pilot collection cycle that this method of promotion was inadequate. Visual observation during initial collection routes indicated that only approximately 5-10% of the pilot area households responded to the letter/doorhanger approach. This level was consistent during route monitoring conducted by a County intern several weeks into the pilot program.

During the initial months of the pilot, periodic newsletters (see Appendix C) were the primary promotional method. In July of 2002, kitchen containers were researched and containers were ordered for almost all households within the weekly pilot areas. A 10-liter container[4] distributed by Arata Equipment was selected. The County and participating cities funded the container purchase, and containers were delivered by City and County intern staff in late August.

In retrospect, the kitchen containers should have been used as a tool for program roll-out. More residents would have become aware of the pilot if they had received a physical item in addition to the program brochure. That, in turn, would likely have created more of a "buzz" about the program and elicited more initial (and hopefully sustained) participation. The initial distribution of kitchen containers would have also created a clearer distinction for residents between the pilot areas and non-pilot areas. This would have better addressed the possibility that residents in areas outside of the pilot area would inadvertently participate and thus "contaminate" their yard debris with unacceptable foodwaste. The distinction of the kitchen container would allow wider promotion of the pilot without needing to mute the message in order to ensure that only pilot area households were aware of the program.

---

[2] *(206) 352-9565*
[3] *foodrecycling@zerowaste.com*
[4] *the same container used by San Francisco's organics collection program*

After kitchen container distribution, no additional pilot area promotion was performed other than periodic newsletters mailed to the pilot area participants. This has allowed a reasonable measure of the level of natural interest in organics diversion and the degree of participation likely to be expected if expanded organics collection is incorporated into existing yard debris programs without extensive promotion, economic incentives, disposal restrictions or other supporting policies.

2.2 Interim Results

The design of the pilot included the development of a tracking spreadsheet to compare the pilot area with the previous year, corrected for background variations in weather (which affect yard debris generation) and city-wide generation patterns (In particular, Kirkland generation patterns were expected to change significantly due to major service changes independent of the foodwaste pilot). The tracking spreadsheet is based on the amount of organics and garbage collected, calculated in pounds per household per month. The spreadsheet was intended to gauge the performance of the pilots as well as calculate the net tipping fee savings generated by diverting organics from the disposed stream to the composted stream. This method was intended to "true-up" the hauler's costs and savings due to the pilot.

One of the pilot area criteria was to ascertain which routes had not varied from year-to-year, in order to make comparisons of data from 2000 and 2001. This proved to be a very difficult task, since both haulers had recently undergone management changes and had overhauled routes in all cities. In addition, garbage and yard debris routes rarely overlapped, so it was doubly difficult to isolate both the garbage and yard debris impacts of the pilots.

In practice, tracking pilot performance based on these measures was problematic. Natural variations in garbage and yard debris generation tended to overshadow changes due to pilot activities, particularly in weekly cities with modest participation levels. Route-based tracking did not appear to provide a level of accuracy that clearly determined pilot area performance. Nevertheless, the data indicated that there was clearly an increase in organics collection, corrected for background variations, in Issaquah, Redmond and Lake Forest Park. The pilot areas in those three cities appear to have diverted an average of 12.0, 12.9 and 31.3 pounds per household of foodwaste, respectively, during the first nine months of the pilots. The Kirkland pilot data indicated a negative amount of foodwaste collected, due to the unrealistically high amount of yard debris collection reported for 2001. Thus, the Kirkland results are unreliable without additional work to correct reporting errors for the route in 2001.

Similarly, participation counts based on visual observation were obviously inadequate, based on the route monitoring conducted during the initial months of the pilot. Since the pilot instructions encouraged residents to "bury" their foodwaste in their yard debris carts, visual evidence of participation was very hard to spot during collection. Residents who used large milk or juice cartons to contain their foodwaste provided a more visual clue of participation. Likewise, residents recycling large amounts of soiled paper were relatively easy to spot. Participants were

otherwise very hard to identify because foodwaste tended to blend in with the larger quantity of yard debris recycled during the Spring and Summer yard debris generation seasons.

A more qualitative method of program evaluation was conducted in late 2002. A focus group was convened to gain feedback on residents' experience with the program and their identification of barriers to increased participation. The weekly collection cities' focus group is discussed in detail in Section 2.2.2.

As a result of the aforementioned difficulties, alternative methods for evaluating pilot performance will be implemented in 2003 as discussed in Sections 2.3 and 5.2.

2.2.1 Collection Data

Yard debris generation varies considerably from year to year in Western Washington. As a result, some thought had to be given to how to isolate pilot area foodwaste quantities from the normal annual variation in yard debris generation due to wet and dry years. This was done by developing a tracking spreadsheet for each pilot area which:

1. Compared citywide 2001 and 2002 yard debris collection quantities to determine a multiplier (coefficient) to apply to the pilot yard debris data.

2. Compared 2001 and 2002 garbage collection quantities to determine a coefficient to apply to the pilot garbage data. This was intended to isolate variations in background garbage generation due to factors unrelated to the pilot (e.g. Kirkland's shift from flat to variable rates and the shift to a new recycling program).

3. Compared pilot area garbage and yard debris collection quantities between 2001 and 2002 to determine how the pilot area patterns varied from citywide averages.

4. Used the previous three data sets to infer the proportion of foodwaste and yard debris in the combined organics mix collected in the pilot areas.

Tracking spreadsheets were completed monthly by Waste Management and Eastside Disposal staff for their respective pilot areas, based on their historical and current pilot route data. Appendix H contains the tracking spreadsheets for the three weekly pilot areas and Lake Forest Park.

This approach to pilot evaluation was not entirely successful, although interesting results were obtained for three of the cities – Issaquah, Redmond and Lake Forest Park. Since both haulers had recently undergone management changes, each had restructured many of their routes. This made 2001 to 2002 comparisons very difficult, since most routes had changed. Additionally, garbage and yard debris routes do not typically overlap, which reduced our ability to make comparisons between yard debris/organics recovery and similar reductions in garbage generation. In practice, the impact of seasonal variations and inconsistencies in route data were likely more significant than foodwaste recovery quantities.

Table 3 provides a summary of the tracking data for the weekly cities. All quantities are the nine-month averages in terms of pounds per household per month. As can be seen for the original tracking spreadsheets in Appendix H, results in both Kirkland and Issaquah were inconclusive. In those cities, pilot route combined foodwaste, soiled paper and yard debris quantities were lower than would have been expected for yard debris alone. Since the foodwaste collection quantities could not have been negative, we have assumed that the internal route data inconsistencies have overshadowed the relatively small amount of foodwaste actually collected.

Redmond's foodwaste recovery was estimated at 12.9 pounds per household per month, which is what was expected based on other pilots and full scale programs. However, we cannot necessarily determine that this recovery level is real, as opposed to a coincidence, based on problems on tracking data for Kirkland and Issaquah.

Table 3 – Weekly City Pilot Collection Data

(pounds per household per month)

	April-December 2001		April-December 2002	
KIRKLAND	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**
Garbage	163.6	175.0	146.1	146.2
Yard Debris	109.4	185.5	122.1	134.2
Foodwaste+ Soiled paper	0	0	0	?
ISSAQUAH	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**
Garbage	103.4	91.0	122.4	86.2
Yard Debris	93.8	72.7	86.1	78.7
Foodwaste+ Soiled paper	0	0	0	12.0
REDMOND	**Citywide**	**Pilot Route**	**Citywide**	**Pilot Route**
Garbage	140.2	135.5	134.3	119.5
Yard Debris	119.8	127.9	127.2	131.8
Foodwaste+ Soiled paper	0	0	0	12.9

Although the tracking data comparisons between 2001 and 2002 do not appear to be useful, comparisons between 2002 and 2003 data will be more valid since no route changes have occurred since the pilots began.

Additionally, alternative methods of diversion monitoring should be used to confirm the route level data reported by the haulers, as is discussed in Section 2.3.

2.2.2 Focus Group

On December 3, 2002, a focus group convened, with residents from the three weekly collection cities. A cross section of participants was chosen, with four chosen from each of the weekly cities. Most had children living at home. One of the focus group selection criteria was participation in the pilot program, because the purpose of the group was to get directed feedback on how the program worked in their households. Thus, non-participants were not represented in this focus group.

The focus group was conducted in Kirkland by Carolyn Browne Associates. The full focus group report for the weekly cities is provided as Appendix F to this report.

Findings included:

Major problems cited by the participants:

- Learning how to properly sort the food waste and knowing which paper products belonged with the food recyclables
- Minimizing odors and mess
- Having an appropriately sized container for use in the kitchen
- Creating a system that would work for all families, yet do so with the understanding that each family is unique
- Understanding how the food waste is recycled and how the resulting compost is used

Improvements suggested by participants:

- Educating people about the program's benefits, which may not be known; informing people how recycled food materials will be used and how the program fits within the context of the recycling ethic
- Implementing an incentive or reward for those who participate, such as: garbage credits that lower pick-up fees (based on pounds per week per month); or restructuring fees to benefit those who recycle more
- Providing more container options to fit the needs of different households
- Providing weekly pick-up all year for those who participate in the program
- Providing more promotion and marketing of the program and its benefits

An appropriate name for the program

In an attempt to educate participants to understand that soiled paper products are a critically important waste to recycle along with food, the project team experimented with a new name "Compostable Recycling." Participants in the focus group were asked to specifically offer comment on this term and there was consensus that the title was misleading or confusing. Nearly all members of the group agreed that the program should not be called this and proposed:

- "Kitchen Waste Recycling"
- "Food Recyclables"

2.3 Weekly Collection Model Pilot Recommendations for 2003

Recommendations for the weekly pilot areas include:

- **Continue the existing pilot areas without expansion.** Kirkland and Redmond are rebidding their collection contracts during 2003. This will occupy staff time, reducing the amount of time available to incorporate additional pilot areas. The rebidding process will incorporate an option for city-wide organics collection. Issaquah, the remaining weekly collection city, already has collection on one full route that represents a cross section of City residents. Little additional data would be gained at this point by immediately adding another route.

- **Develop alternative diversion tracking methods.** The existing route-based tracking system will be continued with support from a can-weighing sampling program. Garbage and organics containers will be tracked in pilot and non-pilot control areas for four consecutive weeks each quarter. This will provide direct data on how organics (or yard waste) and garbage quantities vary between comparable pilot and non-pilot areas.

- **Monitor participation.** Although inexact, additional visual monitoring of the collected organics stream will be periodically conducted to estimate the percentage of households placing foodwaste and soiled paper in their yard debris containers. The monitoring will be conducted by intern staff riding in collection vehicles on a quarterly basis.

- **Address residents without yard debris.** Some residents without yard debris (e.g. condominium owners or those with yard service) expressed an interest in participating in the pilot. Since the pilot is based on mixing yard debris and foodwastes, the pilot system is not designed to accommodate separate foodwaste collection. Some thought should be given to testing the adequacy of separate soiled paper/foodwaste collection in animal-proof containers, as is being done in Toronto, Ontario. Depending on the level of interest on the part of the City and hauler, this may be done later in Spring 2003 in the City of Issaquah, which has a number of townhouses on their existing pilot route.

- **Weekly city composition analysis.** One sorting run of garbage and organics (similar to the analyses conducted in late 2002 for Lake Forest Park) will be conducted in the early Fall in one or more weekly cities.

- **Determine composting parameters.** The composting facility used by both collection contractors will test composting system alternatives for higher levels of foodwaste in order to address Health Department concerns. These tests will include the application of an alternative in-vessel composting system as well as testing various levels of foodwaste mixed with yardwaste. The facility will import commercial foodwaste loads to test various mixes during 2003, as well as continuing to handle the materials collected by WMI and Eastside Disposal in the pilot areas.

3. Lake Forest Park Pilot Program

The 2002 Lake Forest Park pilot was based on alternating garbage and organics collection on successive weeks. Organics were collected in aerated carts every-other-week and garbage was collected in existing containers on the following week. This eliminated the need for the existing yard debris collection route, since a single packer would be able to collect both the garbage and organics streams on different weeks.

This system was expected to cost less than existing separate routes for garbage, recycling and yard debris and to result in rate reductions over time, depending on the degree to which those savings could be recaptured through existing collection contracts.

The key of every-other-week collection of organics is the use of an aerated cart because waste materials sit longer and their degradation on site contributes to increased odor generation. Aeration allows oxygen to enter the waste containers and reduce odor impacts. Aerated carts typically have subfloors with a leachate collection area, fluted sides that act like chimneys to increase air circulation, and screened tops with a rain cover to encourage aeration. All major cart manufactures (including Rubbermaid, Rehrig-Pacific, and Schaefer) make at least one version of aerated or semi-aerated cart, with Schaefer capturing most of the market for every-other-week organics collection programs. Schaeffer Compostainers were leased for use in the 2002 Lake Forest Park pilot.

All participants within the every-other-week collection pilot area were provided with a 60-gallon aerated cart for the pilot duration. Existing yard debris carts were not used as the primary organics container during the pilot. Residents were instructed to either use their existing yard debris carts for extra yard debris during the course of the pilot program or store the cart until the pilot is complete.

3.1 Implementation

Two notification letters were mailed to pilot area residents, one each in the two months preceding the pilot start date of May 1, 2002. The first letter established a pilot start date of April 1, 2002 (in sync with the other weekly city pilots). However, delays in obtaining final authorization from the City Council, in developing the pilot brochures and supporting materials, and in obtaining the Compostainer carts required a shift in the pilot start date. A follow-up letter was mailed late March, establishing the May start date.

During the last week of April and the first few days of May, Eastside Disposal delivered the Compostainers to pilot area households. The Compostainers included a kitchen container and a program brochure. As with the weekly collection pilots' households, phone, e-mail and webpage contact information was provided to address residents' questions.

There were 15-20 residents who strongly objected to the pilot and demanded that they receive weekly garbage collection. Those calls were routed to the City, and the city project manager discussed the pilot program in attempts to encourage those residents to at least try the pilot. However, some residents insisted on retaining weekly garbage collection, which was then

provided. By the end of the year, 14 households had opted-out of the pilot and were receiving weekly garbage collection. Those residents were instructed to place all their garbage in plastic bags, placed in their regular garbage container. During the first few months of the program, the opt-out resident's garbage was collected in either a pick-up or service truck instead of a regular packer truck to reduce confusion over the alternating week collection schedule. Later in the pilot, Eastside Disposal shifted to collecting the opt-outs in a mini-packer. Interestingly, the opt-outs tended to cluster geographically, perhaps from neighbors letting each other know that complaining about the program might allow them to opt-out and receive weekly garbage collection. Having to service the opt-outs on a weekly basis eliminated most of the route cost savings of the alternating every-other-week collection model and would need to be addressed before permanently implementing the program.

The first organics collection was May 15th, 2002. During the first two months of the pilot, consultant staff provided route support on organics collection days, including being available to deal with contaminated materials, delivering additional containers and collecting garbage from residents opting out of the program. After the first two months, Eastside Disposal assumed responsibility for all customer service functions.

3.2 Interim Results

The Lake Forest Park pilot had the highest participation and diversion rates among the four pilot cities. This was likely due to the semi-mandatory nature of the program. If residents did not participate, they would need to store two weeks of garbage before collection, whereas if they participated, they were ensured of having a minimum of weekly collection for all putrescibles (if they placed their foodwaste in the garbage during their garbage week). Although only 5% of the pilot area residents opted-out of the program, not all the remaining 95% may have actually participated in the pilot. Some residents may have placed all their foodwaste in their garbage in order to adapt to the every-other-week collection cycle without changing their practice of putting their foodwaste in the garbage can, while others may have participated at varying levels.

The every-other-week pilot did not provide clear cost savings due to the need to collect "opt-outs" on the off weeks. Under full scale implementation "opt-outs" would either be disallowed or provided weekly service at a premium rate that reflected the costs of running the separate weekly route. Under this scenario, the large majority of customers remaining on every-other-week service would likely experience a rate reduction, while the few "opt-out" customers would experience a rate increase.

3.2.1 Collection Data

The same tracking data was compiled for the Lake Forest Park pilot as was described for the weekly cities under Section 2.2.1. In the case of Lake Forest Park, the much higher apparent participation levels (due to the alternating week collection schedule) provided better data and reduced the significance of other factors affecting the collection data.

The combined yard debris and foodwaste quantities are clearly higher than yard debris alone, totaling a monthly average of 83.3 pounds per household, of which 52.2 pounds are inferred to be yard debris and 31.1 pounds are inferred to be foodwaste. Garbage collection quantities

declined an average of 19 pounds per month per household. The difference between the 19 pounds per month garbage reduction and the 31.1 pounds per month of apparent foodwaste diversion may be due to increased garbage generation, a relaxed policy on garbage extras, some level of redirecting foodwaste from in-sink disposals or backyard composting, or simply sampling variation in the estimates of the split between yard waste and foodwaste in the total weight of organic materials collected. One might expect differences due to the first two possible causes to decline over time as people adjust to the new system and disposal of accumulated "extras."

Table 4 – Lake Forest Park City Pilot Collection Data
(pounds per household per month)

	May-December 2001		May-December 2002	
	Citywide	Pilot Route	Citywide	Pilot Route
Garbage	117.8	118.7	116.6	99.7
Yard **Debris**	64.5	43.1	78	52.2
Foodwaste+ Soiled paper	0	0	0	31.1

3.2.2 Composition Analyses

Two composition analyses were conducted for the Lake Forest Park pilot. A comparative sort of garbage from 31 pilot area households and 32 non-pilot households was conducted on October 9, 2002, and a sort of a portion of the mixed organics load collected from the pilot area was conducted on October 17th. Both sorts were performed by Green Solutions using hired temporary crews.

The objective of the garbage sort was to determine how the composition of disposed waste varied between pilot and non-pilot areas, with a particular focus on how much kitchen waste was captured by the collection program. Accordingly, the sorting categories were defined to focus on kitchen organics rather than the full range of materials typically covered by waste composition analyses. Eastside Disposal collected materials separately from the 31 pilot area households and the 32 non-pilot households and delivered each load to King County's First Northeast Transfer Station, where Green Solutions performed the sort.

The objective of the organics sort was to determine the relative proportion of foodwaste, soiled paper, yard debris and contaminants present in the pilot area organics stream. After the load was delivered to the Cedar Grove Composting facility, a representative sample was separated and sorted into the same categories used for the garbage sort.

The full report is provided as Appendix E.

Key findings from the report include:

- Comparisons of garbage composition from the pilot area and non-pilot area show that the pilot project has led to a significant reduction of disposed foodwaste.

- The results of samples taken from the organics stream in the pilot area confirms that foodwaste and compostable paper are being diverted from the waste stream.

- Curiously, the amounts of other wastes, including kitchen garbage, recyclable containers, recyclable paper and other household garbage, were higher in the load of garbage from the pilot area[5]. The amount of foodwaste found in both pilot area and non-pilot area garbage samples, on a percentage basis, is significantly higher than the amount of foodwaste typically found in garbage according to recent waste composition data for single-family homes in King County. On a per capita basis, however, the difference is not as great, leading to the possible conclusion that this area is performing somewhat better than average on diverting other materials in the first place. In other words, as greater amounts of recyclable materials such as cans and bottles are diverted, the greater the apparent percentage of remaining materials. However, the small sample size increases the possibility of error and random variation clouding the results, so this result should be viewed with caution.

Table 5 provides a summary of the composition of the garbage and organics samples by sorting category.

Table 5 – Composition of Samples, Percent by Weight

Material Category	Pilot Area		Non-Pilot Area
	Organics	Garbage	
Yard Debris	85.5%	2.2%	0.1%
Foodwaste	6.6	25.1	38.7
Compostable Paper	6.5	5.8	7.9
Kitchen Garbage	0.0	*6.2*	4.0
Recyclable Containers	0.02	7.1	4.2
Recyclable Paper	0.3	12.2	11.0
Other Household Garbage	1.1	35.5	24.6
Other	0.0	6.1	9.3
TOTAL	**100.0%**	**100.0%**	**100.0%**

Table 6 provides a summary of the garbage and organics generation rates observed from the sorted samples.

[5] *The analysis had no controls on potential variables that would cause total garbage quantity to differ – e.g., household size and income. Pure random variation would make it almost impossible for the average weight of garbage per household from the two samples to be the same (In other words, it's a certainty that one sample average would be higher than the other). The question for ruling out random variation is whether the higher variable was significantly higher in the statistical sense.*

Table 6 – Results, Pounds per Household per Week

Material Category	Pilot Area, Organics[1]	Pilot Area, Garbage	Non-Pilot Area, Garbage	Average for King County[2]
Yard Debris	13.9	0.5	0.03	1.4 (0.9 - 1.9)
Food Waste	1.1	5.8	8.9	6.5 (6.0 - 7.0)
Compostable Paper	1.1	1.3	1.8	NA[3]
Kitchen Garbage	0.0	1.4	0.9	NA
Recyclable Containers	0.0	1.6	1.0	1.7 (1.4 -1.9)
Recyclable Paper	0.0	2.8	2.5	NA
Other Household Garbage	0.2	8.1	5.7	NA
Other	0.0	1.4	2.1	NA
Total	**16.3**	**23.1**	**23.0**	**27.2**

Notes:
1. *Per-capita rates have been calculated based on weight of the organics load and the total number of households in the pilot area (296 households), including non-participants.*
2. *Average values for King County have been derived from the final report for the Waste Monitoring Program (Cascadia 2000) with additional analyses by King County staff and Green Solutions to derive per-capita figures.*
3. *NA = Not Available, direct comparison of some of the categories used for this project versus categories from the Waste Composition Study are not possible due to differences in definitions and sorting methods.*

3.2.3 Survey

In July 2002, residents within the pilot program area of the City of Lake Forest Park were mailed a Food Recycling program newsletter containing a letter from the Mayor of Lake Forest Park, a program update, question and answer section, helpful tips, reminder of acceptable and non-acceptable items and a survey.

Goals of the survey were to evaluate the effectiveness of outreach and education methods employed prior to commencement of the pilot to inform residents of the program and to explain the importance of food recycling, goals of the program and how the program would work. The survey also sought to obtain resident feedback on the functionality of the Compostainers, participation rates, understanding of the program, observed decreases in garbage volume, and factors that reduced and increased willingness to participate. Additionally, the survey was deliberately sent during summer so as to obtain feedback during the hottest months when it was expected that some concerns would be greatest.

The full survey report is provided as Appendix D. Survey results include:

- 73 respondents out of 296 pilot area households completed the survey, a return rate of 25%
- 82% reported that program instructions were clear
- "Managing food wastes in the kitchen" was reported as the largest barrier to participation, at 34%; however, 86% reported using their Compostainer, with 85% reporting that they place food wastes in their Compostainer
- Residents appear to understand the concept of mixing materials to reduce odors - only 4% reported placing food waste only in their Compostainer

- 78% reported the Compostainer's functionality to be the same, better or excellent compared to their existing yard waste containers

- 59% reported noticing a decrease in their garbage volume

- The major "dislikes" were reported as "smell / mess / flies," at 27%, and "reduced garbage pickup," at 21%, but many respondents who reported these dislikes also reported program "likes"

- 50% reported program advantages. The "like" most often reported was "expanded recycling / reduced garbage / less material to landfill," at 34%.

The survey from included space for respondents to provide suggestions or comments. Most suggestions were related to variations to the pick up schedule and to pricing structures for future programs

3.2.4 Focus Group

On October 29, 2002, a focus group was held with residents from the Lake Forest Park pilot area. A cross section of pilot area residents was chosen including both participants and non-participants. Half of the focus group members had children living at home. The focus group was conducted in Lake Forest Park by Carolyn Browne Associates. The full focus group report for the weekly cities is provided as Appendix G to this report.

Findings included:

Major Advantages:

- Educational materials instructing what materials were to go into the container

- Having a way to recycle foodwaste and soiled paper products

- Extra yard waste disposal

Major problems cited by the participants:

- Dissatisfaction with every-other-week pickup of garbage because of too much material

- Problems with odors and flies

- Perceived inconvenience of having to sort out the items to be recycled

- Program perceived as unnecessary because of little foodwaste generation or existing alternatives

Improvements suggested by participants:

- Implementation of an incentive or reward for those who participate
- Alternatives to the kitchen container, such as a milk carton or wrapping foodwaste in paper
- Education about how recycled food materials will be used

3.3 Every-Other-Week Collection Model Pilot Recommendations for 2003

Recommendations for the Lake Forest Park pilot area include:

- **Expand the pilot area to include the entire Wednesday route.** The initial 2002 pilot covered approximately half of Eastside Disposal's Wednesday route. This created operational difficulties for Eastside Disposal, since they had to cover the pilot and non-pilot remainder of the route separately. Extending the pilot to cover the entire area will ease their operations as well as allow a broader sample size.
- **Shift to weekly collection of organics.** While every-other-week collection appears to work without difficulty, the infrequency of collection may be a barrier to some residents due to negative perceptions of foodwaste "rotting," or lack of understanding or interest in bulking out foodwaste material in their organics cart with yard debris or soiled paper. Shifting to weekly organics collection would be a higher level of service than currently offered in either the pilot or non-pilot areas of Lake Forest Park.
- **Retain every-other-week garbage collection.** Garbage collection remained every-other-week in the 2002 pilot area and will be expanded to the remainder of the route in March 2003. Every-other-week garbage collection provides an incentive to residents to participate in the weekly organics program as well as reduces the costs and environmental impacts of collecting largely non-putrescible garbage weekly.
- **Increase garbage collection container size and test automated collection.** During the 2002 pilot, residents were asked to place two weeks worth of garbage in their existing garbage container on the assumption that diverting organics would reduce garbage by half. Additional garbage cans were provided to households on request. For the 2003 pilot, all households will be provided with a garbage cart of roughly twice the capacity of their weekly service levels (e.g. a customer at a single 32-gallon service level will receive a 64-gallon cart). Once all households have garbage carts, Eastside Disposal will test automated garbage and organics collection.

- **Develop alternative diversion tracking methods.** The existing route-based tracking system will be continued with support from a can-weighing sampling program. Garbage and organics containers will be tracked in pilot and non-pilot control areas for four consecutive weeks each quarter. This will provide direct data on how organics (and/or yard waste) and garbage quantities vary between comparable pilot and non-pilot areas.

4. Composting

All pilot material was delivered to the Cedar Grove Composting facility in Maple Valley. Both haulers were previously directing the pilot city yard debris to Cedar Grove, so the mixed organics from the pilot areas were handled under the haulers' existing contracts with Cedar Grove. See Appendix J for a discussion of the composting process.

Results

All pilot materials were successfully composted consistent with the compost plan presented to the Health Department prior to starting the pilots. The finished material was marketed with Cedar Grove's other compost products. Contrary to expectations, there has been almost no contamination in the collected organics mix, with levels experienced close to the background contaminant level of regular yard debris. All materials were processed to meet pathogen reduction requirements with no adverse impacts or corrective measures required.

Due to the very high yard debris generation rate in the pilot cities, the foodwaste component was proportionately low, even in the Lake Forest Park loads. Few, if any, changes in the composting process were necessary to handle the yard debris/soiled paper/foodwaste mix.

5. 2003 and Beyond

5.1 Comparisons with Other Programs

At the end of 2002 and early 2003, Meucci Consulting surveyed other known North American organics collection programs to determine current status, to review promotional strategies and design, and to develop recommendations on how to increase participation in the King County pilots. A copy of that survey is provided in Appendix I to this report.

Program Set-up

Based on the interviews and information found on corresponding websites, the most successful food scrap recycling programs are those using a wheeled cart and kitchen pail with a lid and handle (with or without a liner). These programs offer weekly collection of yard waste, soiled paper products and food scraps.

Liners are preferred by participants when asked about them, but do not seem to make a difference in overall participation rates. If given the choice, participants would choose to have liners. Most communities provided some type of liner as part of a pilot program to see if it made any difference in participation or diversion rates, but few have provided them when the program went community-wide. Instead, most have opted to make liners available for purchase either through local retail outlets or by phone order and provided alternative ideas (reusing paper grocery sacks, wrapping with newspaper, freezing, etc.) for keeping the pail clean without the use of a liner. Offering two sizes of containers (pails especially) was suggested by several communities as a way to make the program more attractive to some customers. However, the majority of communities offer just one size and no major problems have been reported. Suggestions for participants who did not want to use a pail included conveying to people that use of the pail is optional and suggesting alternative containers (i.e. empty milk cartons).

Fall (mid-to-late October) and spring (March or April, preferably after school spring breaks) are the most popular times to launch programs. They are prior to extreme weather months and do not conflict with major holidays or school breaks. After initial start-up promotions, most programs directly contact participants on a monthly or quarterly basis. Ideal contact seems to be monthly in some form (indirect on a monthly basis, direct on at least a quarterly basis).

Outreach Methods and Materials

Education and promotion efforts were identified as the single biggest determining factor in the overall success of a program. Program managers interviewed were emphatic about the importance of starting promotions early (one month prior to start date at a minimum), planning for broad-based promotions, and budgeting to provide on-going education and promotion efforts. The single biggest regret most program managers had was not starting outreach early enough and not doing enough of it.

Some communities hosted information meetings or open houses prior to the start. Most experienced low turnout and would not recommend them unless they were required. An alternative would be to participate at an existing event that many residents would already be attending (school fair, farmer's market, etc.) In general, other program managers suggested directly addressing participants with the message; don't expect them to come to you.

Most communities used direct mail to participants at the start, but then relied primarily on media attention and other indirect methods of contact for long-term promotions. On-going, regular contact was mentioned frequently as important in a program's success. Most program managers said they would increase the frequency of contacts a participant has with the program – especially after the initial start. Some programs have seen a slight decline in participation after the initial start. The cause is unclear. A natural seasonal flux, seasonal changes in living habits (i.e. travel/dining out more) or changes in attitude were all suggested as possible reasons.

Monthly contact in some form seems to be the minimum that most program managers think participants need. This contact can be minor and could come from a variety of sources –

postering, community events, newsletters (business, chamber, non-profits, government), media attention, signage (bus, truck, billboard, etc.) or public speaking/presentations. Press releases can be issued at specific program milestones: when certain participation and diversion rates have been achieved; when new materials are added to any part of the recycling program; when landmark tonnages have been reached; or when the first batch of compost is sold, bagged or goes to market. Use any new announcement about anything garbage or recycling-related as a time to further promote the program.

The majority of communities have taken a fact-based, simple approach when designing their educational materials (versus cartoon-type or humorous). Most have used straightforward titles and wording ("Food Scrap Recycling" has been most popular). Communities who developed single color, "copier" quality materials were disappointed with the look and would spend the extra time and money upgrading the materials in the future. Text has been a challenge for many program managers, especially balancing the desire to give detailed info on acceptable and non-acceptable materials versus being too specific or wordy and ending up with cluttered pieces. Most program managers said the goal is to provide simple, easy-to-follow instructions with clear, visual graphics. Several contacts mentioned the importance of including the benefits of participating (financial, environmental, civic) in educational materials, providing incentives for participation (variable can rates, discounted compost, random prizes, etc.) and getting the support of local politicians, media and haulers.

Most communities printed materials in English only. San Francisco has multiple language issues to consider so they moved toward mostly graphic print pieces, but continue to print each piece in three languages (English, Spanish and Chinese). Toronto chose instead to print several versions of each piece (English, French and Braille).

At a minimum, the following outreach materials for each household were most common:

- **Toter/cart label** (including program name/logo, hauler name, phone number, website address and list of general materials accepted).

- **Pail label** (listing acceptable/not acceptable items, program name/logo, phone number and website address).

- **Instruction brochure or flyer** appealing enough to post or keep for future reference. Contents should include: overview of program, list of acceptable/not acceptable items, plenty of graphics or photos of containers and acceptable items, sponsor and contact info, summary of benefits of participating, incentives, and a brief description of what compost is, how it is made and why it is important for the individual, community and environment.

- **Toter/cart hang tag or doorhanger** introducing the program (optional, but could be used during delivery as a way to introduce program).

- **Toter/cart hang tag** for problems (a checklist-style tag for drivers to leave behind if there are any contamination or collection issues).

- **Collection calendar** listing collections for the coming year. Provided once a year via mail, website and/or email.

- **Hotline or other reliable phone contact** (some communities have established a "Rotline.")

- **Website with updated info** (a valuable tool, easy-to-update and available to participants 24 hours a day.) All program materials (brochures, flyers, letters, calendars, etc.) should be made available on this site.
- **Communication:** The most successful programs made the most of media communications, issuing press releases on a regular basis and setting up media photo opportunities. Several communities use the following schedule for media contact (issuing press releases, meeting with editorial boards, setting up photo opportunities, etc.)

No program interviewed as part of this report targets materials to a specific person in a household. In addition, the general materials used provide most participants with enough info on how to set up the program inside their homes. If not, most questions are resolved via a phone conversation with the participant.

Data Collection/Program Monitoring

Very few communities are doingdetailed data collection beyond monitoring participation rates and diversion rates. In some programs, drivers have counters and participation rates are derived from those numbers. In other programs, staff goes out ahead of a collection truck, counts the number of carts set out and lifts the lid to do a visual check for food scraps. No poking is allowed. If no food scraps are seen, the cart is not counted. This type of monitoring can occur quarterly or semi-annually. It seems to occur more frequently at the start of a program and then tapers off as the program becomes more established. Typical participation rates ranged from 25%-40%. Diversion rates were around 30%.

None of the surveyed programs are performance testing any promotional materials per se, nor do any have plans to in the future. Several communities have asked questions about recall and retention of specific educational information during phone surveys or opinions on usefulness of various methods (for example, which method a person would prefer—door-to-door campaign versus a newsletter).

Program Challenges

Overall, no communities were experiencing serious problems with their programs. Challenges were typical and fixable. The "ick" factor (odors and pests), no time, and already home composting were major reasons for not participating. For people that called or contacted staff with complaints or questions, most were about smell, storage issues (where to put the cart) or a request for liners or liner alternatives.

5.2 2003 Plan for Pilot

Weekly Cities (Issaquah, Kirkland, Redmond)

In the three cities with weekly collection, we intend to continue the status quo and will not expand any of the service areas at this time. There will be no changes in garbage or yard debris collection frequency. We will continue with the existing route boundaries and intensify promotion and education to increase participation and organics capture levels. We also expect to experiment with containerization options to better accommodate those residents who do not use yard debris services but wish to recycle kitchen organics.

Lake Forest Park

In Lake Forest Park we intend to implement significant changes to the program, in response to customer feedback. Instead of the existing every-other-week alternating garbage and organics collection schedule, we will be shifting to weekly organics collection and continuing every-other-week garbage collection, starting **March 1st**. This is the system the City of Toronto implements. To provide additional garbage collection capacity, we will be shifting from customer-owned garbage cans to universal distribution of contractor-owned wheeled carts, sized to approximately twice the customer's weekly ("pre-pilot") service level. Eastside Disposal has requested to employ the pilot across the entire 625 household route rather than continuing with the current fragmented pilot route. Expanding the route will allow us to test the 2003 Lake Forest Park pilot in areas which have not previously experienced reduced frequency garbage collection. This will provide us additional information on the feasibility of this approach and the comparative participation between the 2002 and 2003 pilots.

Composting

Cedar Grove will continue to accept the combined yard debris, foodwaste and soiled paper from the collection contractors. It is our understanding that they will be testing the impact of both increased levels of foodwaste in their yard waste mix and source-separated commercial food waste composting, as well as testing alternative in-vessel technologies.

Promotion and Outreach

Promotion will be stepped up in the program to more frequent mailings then were sent in 2002. Pieces will include regular newsletters and postcards with educational information such as "how to's", "do's" and "don'ts," suggestions on kitchen management, and facts about composting, recycling, etc.

The program name will also be changed to "Food Recycling" to better reflect the emphasis on both food and soiled paper.

Pilot Monitoring

Pilot monitoring will be expanded in 2003 to include four components:

1. **Can weight monitoring**: Sample garbage and yard debris containers will be weighed in two cities to determine actual diversion performance for control versus pilot area households. The weight monitoring will be performed in February, May, August and November. A total of 160-200 households will be tracked.

2. **On-route monitoring**: The routes in one or two cities will be periodically monitored several times during the year to track participation counts, participation patterns, contamination items and levels, and other route data.

3. **Composition Analyses**: Several composition analyses will be conducted on both the organics and garbage streams as was done last year in Lake Forest Park. These will likely focus on one of the weekly cities for 2003.

4. **Survey**: Either another focus group or phone survey will be conducted later in the year to gain additional data on participation attitudes, habits, and barriers, as well as testing the response to our 2003 promotion program and the selected program identity.

5.3 Future Diversion Potential

Although foodwaste and soiled paper represents about 30% of the single family disposed wastestream in King County, the diversion potential of this material is limited by participation rates. Under virtually all likely implementation scenarios, participation in foodwaste and soiled paper programs is expected to be significantly below corresponding recycling participation rates. This is probably due to a combination of barriers ranging from the "ick" factor, kitchen space constraints, and unwillingness to spend time and effort to understand a new program and to separate another material out of the household waste stream.

Table 7 provides a summary of the foodwaste and soiled paper diversion for the three eastside pilot cities (plus Bellevue) and Lake Forest Park (all of whom are most likely to seek full scale residential foodwaste collection services in their hauling contracts) under two scenarios: 20% capture and 50% capture. The 20% capture estimate reflects likely near term performance during the initial stages of program implementation. The 50% capture represents the maximum likely performance several years after implementation, assuming widespread availability, education and acceptance. It is worth noting that even at 50% capture the foodwaste and soil paper tonnages are far outweighed by yard debris quantities.

Table 7 – Diversion Potential Under 20% and 50% Capture

	House-holds	SF[6] Garbage Tons[7]	Percentage MWP/FW[8]	SF FW/Pap Tons	20% Tons Diverted	50% Tons Diverted	**Current YW Diverted**
Lake Forest Park	3,781	2,741	30.8%	844	169	422	**569**
Kirkland	10,520	10,003	30.8%	3,081	616	1,540	**6,658**
Redmond	8,870	7,647	30.8%	2,355	471	1,178	**5,528**
Bellevue	25,100	17,245	30.8%	5,311	1,062	2,656	**12,972**
Issaquah	2,585	2,014	30.8%	620	124	310	**992**
Total		39,650		12,212	**2,442**	**6,106**	**26,719**

If all of the eastside cities listed in the table and Lake Forest Park implement full scale organics collection programs citywide, the expected foodwaste and soiled paper tonnage would range from approximately 2,500 to 6,100 tons per year, and equal from 8.4% to 18.6% of the total organics mix received from those cities on an annual basis.

[6] SF=Single Family, which is typically 1-4 dwellings per structure, depending on the respective city's collection contract

[7] All tonnage data from 2000 Hauler Database (contact Beth Humphreys, SWD (206) 296-4365)

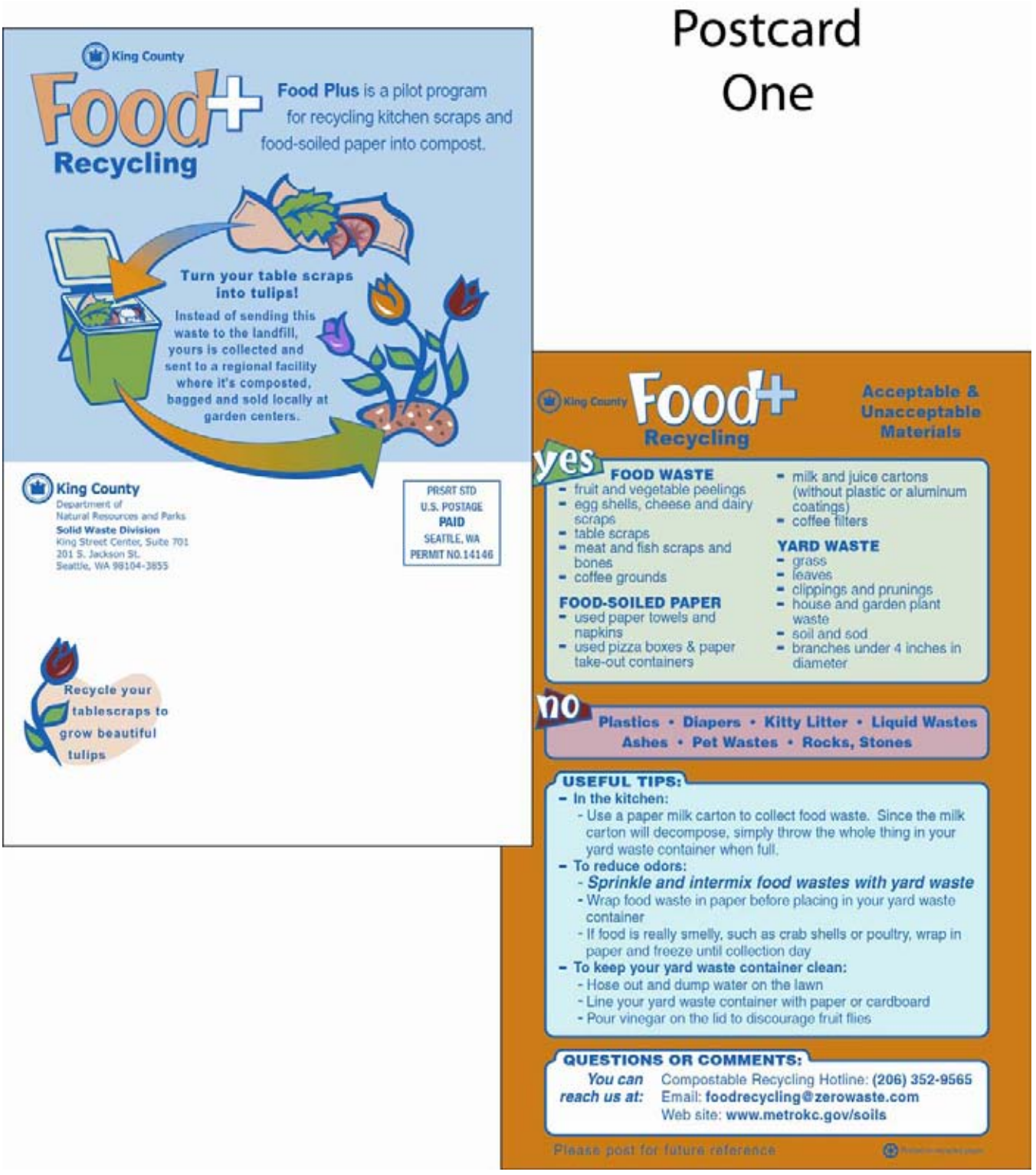
[8] KC 1999/2000 Waste Stream Characterization, page 21 ("Food Wastes" + "Other Paper" categories)

APPENDICES:

A: SAMPLE MEMORANDUM OF UNDERSTANDING FOR PILOTS
B: DOORHANGERS
C: NEWSLETTERS
D: SURVEY RESULTS
E: WASTE AND ORGANICS SORT RESULTS, GREEN SOLUTIONS
F: WEEKLY CITY FOCUS GROUP RESULTS, CAROLYN BROWNE ASSOCIATES
G: LAKE FOREST PARK FOCUS GROUP RESULTS, CAROLYN BROWNE ASSOCIATES
H: TRACKING SPREADSHEETS FOR PILOT AREAS
I: RESIDENTIAL FOOD SCRAP COLLECTION AND RECYCLING PROGRAMS, MEUCCI CONSULTING
J: CEDAR GROVE COMPOSTING PROCESS

Appendix B. Postcards

Postcard One



Postcard Two

King County

Food+ Recycling

Food Plus is a pilot program in your neighborhood for recycling kitchen scraps and food-soiled paper into compost.

How does your garden grow?

Kitchen scraps recycled in this program are composted at a regional facility and sold locally to improve garden soil.

King County
Department of
Natural Resources and Parks
Solid Waste Division
King Street Center, Suite 701
201 S. Jackson St.
Seattle, WA 98104-3855

PRSRT STD
U.S. POSTAGE
PAID
SEATTLE, WA
PERMIT NO. 14146

Recycle your kitchen scraps and food-soiled paper into your yard waste cart.

King County Food+ Recycling

Did you know?
Food waste and soiled paper made up nearly 25 percent of King County household waste in 2001.

Food+ recycling is good for the environment and reduces landfill waste.

yes

FOOD WASTE
- fruit and vegetable peelings
- egg shells, cheese and dairy scraps
- table scraps
- meat and fish scraps and bones
- coffee grounds

FOOD-SOILED PAPER
- used paper towels and napkins
- used pizza boxes & paper take-out containers
- milk and juice cartons (without plastic or aluminum coatings)
- coffee filters and tea bags

YARD WASTE
- grass
- leaves
- clippings and prunings
- house and garden plant waste
- branches under 4 inches in diameter

no

• Plastics • Diapers • Kitty Litter • Pet Wastes • Liquid Wastes • Ashes • Rocks, Stones

USEFUL TIPS:

The nose knows. To prevent odor, mix plenty of paper in your compost collector.

Consider wrapping and freezing meat, poultry or fish scraps until collection day.

Line your yard waste container with paper or cardboard to absorb liquids.

Pour vinegar on the lid to discourage fruit flies.

QUESTIONS OR COMMENTS:

Tell us how you're doing:

Food+ Recycling Hotline: **(206) 352-9565**
Email: **foodrecycling@zerowaste.com**
Web site: **www.metrokc.gov/soils**

Please post for future reference

Printed on recycled paper

CITY OF LAKE FOREST PARK

THE CITY OF REDMOND WASHINGTON

CITY OF KIRKLAND WASHINGTON

CITY OF ISSAQUAH

Postcard Three

King County

Food+ Recycling

Food Plus is a pilot program in your neighborhood for recycling kitchen scraps and food-soiled paper into compost.

Having a 4th of July Picnic?
Recycle all your food scraps plus paper cups and plates into the Food+ Recycling program.

King County
Department of Natural Resources and Parks
Solid Waste Division
King Street Center, Suite 701
201 S. Jackson St.
Seattle, WA 98104-3855

PRSRT STD
U.S. POSTAGE
PAID
SEATTLE, WA
PERMIT NO. 14146

Recycle all your food and paper picnic leftovers in the Food+ program.
(Ants optional!)

King County **Food+ Recycling**

Did you know?
Food waste and soiled paper made up nearly 25 percent of King County household waste in 2001.

Food+ Recycling is good for the environment and reduces landfill waste.

YES

FOOD WASTE
- fruit and vegetable peelings
- egg shells, cheese and dairy scraps
- table scraps
- meat and fish scraps and bones
- coffee grounds

FOOD-SOILED PAPER
- used paper towels and napkins
- used pizza boxes & paper take-out containers
- milk and juice cartons (without plastic or aluminum coatings)
- coffee filters and tea bags

YARD WASTE
- grass
- leaves
- clippings and prunings
- house and garden plant waste
- branches under 4 inches in diameter

NO
• Plastics • Straws
• Diapers • Kitty Litter
• Pet Wastes • Liquid Wastes
• Ashes • Rocks • Sod

USEFUL TIPS FOR SUMMER:
- Use paper fast food packaging or milk cartons to collect food and soiled paper waste.
- Empty collected waste into your yard waste container each day.
- To reduce odor and absorb liquids, mix food wastes with yard waste and plenty of soiled paper. Or, line your container with paper or cardboard.
- If food is really smelly, such as crab shells or poultry, wrap it in paper and store in your freezer until collection day.

QUESTIONS OR COMMENTS:

We'd like to hear from you:
Food+ Recycling Hotline: **(206) 352-9565**
Email: **foodrecycling@zerowaste.com**
Web site: **www.metrokc.gov/soils**

Please post for future reference

Printed on recycled paper

CITY OF LAKE FOREST PARK
THE CITY OF REDMOND WASHINGTON
CITY OF KIRKLAND WASHINGTON
CITY OF ISSAQUAH

Postcard Four

King County

Food+ Recycling

A Neighborhood Pilot Program for recycling kitchen scraps and food-soiled paper into compost.

Q. What do tailgate parties and compost have in common?

A. Food! Tailgate parties create fast food waste. Remember that both food-soiled paper and food waste go in your kitchen scrap composting collection bin.

King County
Department of
Natural Resources and Parks
Solid Waste Division
King Street Center, Suite 701
201 S. Jackson St.
Seattle, WA 98104-3855

PRSRT STD
U.S. POSTAGE
PAID
SEATTLE, WA
PERMIT NO.14146

Recycle all your food and paper leftovers after the game.

King County **Food+ Recycling**

Did you know? As food and soiled paper collection programs increase, less waste ends up in our landfills and the environmental benefits multiply.

Food+ Recycling is good for everyone.

yes

FOOD WASTE
- fruit and vegetable peelings
- egg shells, cheese and dairy scraps
- table scraps
- meat and fish scraps and bones
- coffee grounds

FOOD-SOILED PAPER
- used paper towels and napkins
- used pizza boxes & paper take-out containers
- milk and juice cartons (without plastic or aluminum coatings)
- coffee filters and tea bags

YARD WASTE
- grass
- leaves
- clippings and prunings
- house and garden plant waste
- branches under 4 inches in diameter

no

• Plastics • Straws
• Diapers • Kitty Litter
• Pet Wastes • Liquid Wastes
• Ashes • Rocks • Sod

USEFUL TIPS FOR AUTUMN:
- Use paper fast food packaging or milk cartons to collect food and soiled paper waste.
- Empty collected waste into your yard waste container each day.
- To reduce odor and absorb liquids, mix food wastes with yard waste and plenty of soiled paper. Or, line your container with paper or cardboard.
- If food is really smelly, such as crab shells or poultry, wrap it in paper and store in your freezer until collection day.

QUESTIONS OR COMMENTS:

We'd like to hear from you:

Food+ Recycling Hotline: **(206) 352-9565**
Email: **foodrecycling@zerowaste.com**
Web site: **www.metrokc.gov/soils**

Please post for future reference

Printed on recycled paper

CITY OF LAKE FOREST PARK

THE CITY OF REDMOND WASHINGTON

CITY OF KIRKLAND WASHINGTON

CITY OF ISSAQUAH

Postcard Five

King County

Food+ Recycling

A neighborhood pilot program for recycling kitchen scraps and food-soiled paper into compost.

Between winter storm clean-ups you'll have a lot more space in your yard waste collection bin for kitchen scraps and soiled paper waste. Please don't let the space go to waste–add in those plate scrapings.

King County
Department of
Natural Resources and Parks
Solid Waste Division
King Street Center, Suite 701
201 S. Jackson St.
Seattle, WA 98104-3855

PRSRT STD
U.S. POSTAGE
PAID
SEATTLE, WA
PERMIT NO.14146

Tip: A used milk carton is convenient for kitchen waste because once full, it can be tossed into your yard waste bin to be composted.

King County **Food+ Recycling**

Did you know? As food and soiled paper collection programs increase, less waste ends up in our landfills and the environmental benefits multiply.

Food+ Recycling is good for everyone.

YES

FOOD WASTE
- fruit and vegetable peelings
- egg shells, cheese and dairy scraps
- table scraps
- meat and fish scraps and bones
- coffee grounds

FOOD-SOILED PAPER
- used paper towels and napkins
- used pizza boxes & paper take-out containers
- milk and juice cartons (without plastic or aluminum coatings)
- coffee filters and tea bags

YARD WASTE
- grass
- leaves
- clippings and prunings
- house and garden plant waste
- branches under 4 inches in diameter

NO

- **Plastics • Straws**
- **Diapers • Kitty Litter**
- **Pet Wastes • Liquid Wastes**

USEFUL TIPS FOR AUTUMN:
- Bones and inedible meat from a holiday feast can all go in your yard waste collection bin.
- Empty collected waste into your yard waste container each day.
- To reduce odor and absorb liquids, mix food wastes with yard waste and plenty of soiled paper. Or, line your container with paper or cardboard.
- If food is really smelly, such as crab shells or poultry, wrap it in paper and store in your freezer until collection day.

QUESTIONS OR COMMENTS:

We'd like to hear from you:

Food+ Recycling Hotline: **(206) 352-9565**
Email: **foodrecycling@zerowaste.com**
Web site: **www.metrokc.gov/soils**

Please post for future reference

Printed on recycled paper

CITY OF LAKE FOREST PARK

THE CITY OF REDMOND · WASHINGTON

CITY OF KIRKLAND · WASHINGTON

CITY OF ISSAQUAH

Appendix C. City Route Data

	City of Lake Forest Park	May	June	July	August	September	October	November	December	Average	Avg. Month
1	2001 Citywide Yard Debris	115.8	85.4	45.1	38.9	45.1	60.6	85.5	39.4	64.5	64.5
2	2002 Citywide Yard Debris	130.4	91.9	59.4	74.5	63.3	73.4	77.1	54.3	78.0	78.0
	2003 Citywide Yard Debris										
3	Annual Variation Coefficient (2)/(1):	1.126	1.076	1.316	1.914	1.405	1.212	0.901	1.377	1.21	1.21
4	2001 Pilot Route Yard Debris	44.3	37.8	37.5	42.5	37.8	34.8	76.7	33.8	43.1	43.1
5	2002 Pilot Route YD+FW	120.6	98.6	110.5	69.5	58.5	77.2	81.8	49.8	83.3	83.3
	2003 Pilot Route YD+FW										
6	2001 Citywide SF Garbage	118.7	115.4	118.4	125.9	115.3	115.4	118.6	114.5	117.8	117.8
7	2002 Citywide SF Garbage	117.7	109.6	116.7	126.6	115.0	117.7	104.3	125.4	116.6	116.6
	2003 Citywide SF Garbage										
8	Annual Variation Coefficient (7)/(6):	0.991	0.950	0.985	1.005	0.997	1.020	0.879	1.096	0.99	0.99
9	2001 Pilot Route Garbage	120.7	112.9	121.8	128.0	108.7	130.4	125.0	102.5	118.7	118.7
10	2002 Pilot Route Garbage	118.7	103.6	121.3	106.4	85.2	72.4	97.1	93.0	99.7	99.7
	2003 Pilot Route Garbage										
11	Pilot: Calculated YD component	49.9	40.7	49.3	81.4	53.1	42.1	69.1	46.6	52.2	52.2
12	Pilot: Calculated FW component	70.7	57.9	61.1	-11.9	5.4	35.1	12.7	3.2	31.1	31.1

	City of Issaquah	April	May	June	July	August	September	October	November	December	Average	Avg. Month
1	2001 Citywide Yard Debris	132.7	100.2	101.4	66.5	59.7	41.8	78.3	195.3	68.5	93.8	93.8
2	2002 Citywide Yard Debris	107.7	182.5	132.0	101.149	61.336	57.17	45.8	46.3	40.8	86.1	86.1
	2003 Citywide Yard Debris											
3	Annual Variation Coefficient (2)/(1):	0.811	1.821	1.301	1.522	1.027	1.368	0.585	0.237	0.596	0.92	0.92
4	2001 Pilot Route Yard Debris	48.0	104.1	83.3	82.4	89.4	75.9	71.0	68.0	32.3	72.7	72.7
5	2002 Pilot Route YD+FW	77.4	102.0	102.5	95.3	64.9	65.4	58.4	71.4	71.3	78.7	78.7
	2003 Pilot Route YD+FW											
6	2001 Citywide SF Garbage	92.5	66.8	94.5	104.8	115.7	97.9	120.4	123.3	114.6	103.4	103.4
7	2002 Citywide SF Garbage	105.8	118.2	108.0	131.2	113.9	113.3	112.3	123.2	175.6	122.4	122.4
	2003 Citywide SF Garbage											
8	Annual Variation Coefficient (7)/(6):	1.144	1.771	1.142	1.252	0.984	1.158	0.933	0.999	1.533	1.18	1.18
9	2001 Pilot Route Garbage	97.1	72.3	106.4	115.8	112.4	101.5	74.2	73.8	65.2	91.0	91.0
10	2002 Pilot Route Garbage	96.4	72.7	66.5	75.1	114.2	85.2	114.4	86.7	64.6	86.2	86.2
	2003 Pilot Route Garbage											
11	Pilot: Calculated YD component	38.9	189.6	108.3	125.4	91.8	103.8	41.5	16.1	19.2	66.7	66.7
12	Pilot: Calculated FW component	38.5	-87.6	-5.9	-30.1	-26.9	-38.4	16.9	55.3	52.1	12.0	12.0

	City of Kirkland	April	May	June	July	August	September	October	November	December	Average	Avg. Month
1	2001 Citywide Yard Debris	124.4	176.0	120.9	104.9	95.1	79.0	94.9	137.6	51.7	109.4	109.4
2	2002 Citywide Yard Debris	146.8	185.3	147.2	137.1	82.5	82.6	97.7	152.7	67.2	122.1	122.1
	2003 Citywide Yard Debris											
3	Annual Variation Coefficient (2)/(1):	1.181	1.053	1.218	1.307	0.867	1.045	1.030	1.110	1.299	1.12	1.12
4	2001 Pilot Route Yard Debris	243.6	232.7	219.1	190.9	154.6	158.9	154.4	231.8	83.9	185.5	185.5
5	2002 Pilot Route YD+FW (RT 699)	178.1	216.3	192.2	118.0	87.4	93.5	93.0	150.2	79.2	134.2	134.2
	2003 Pilot Route YD+FW (RT 699)											
6	2001 Citywide SF Garbage	151.8	172.4	157.1	171.6	171.0	150.3	165.4	169.8	162.6	163.6	163.6
7	2002 Citywide SF Garbage	138.8	150.0	144.4	163.5	145.9	140.0	144.2	139.0	149.4	146.1	146.1
	2003 Citywide SF Garbage											
8	Annual Variation Coefficient (7)/(6):	0.914	0.870	0.919	0.953	0.853	0.931	0.872	0.819	0.919	0.89	0.89
9	2001 Pilot Route Garbage	156.5	150.4	266.5	161.4	162.2	168.4	158.7	183.9	167.1	175.0	175.0
10	2002 Pilot Route Garbage (RT 313)	125.0	144.7	163.3	157.3	153.8	141.3	139.9	148.9	141.8	146.2	146.2
	2003 Pilot Route Garbage (RT 313)											
11	Pilot: Calculated YD component	287.6	245.0	266.8	249.5	134.0	166.1	158.9	257.3	109.0	207.1	207.1
12	Pilot: Calculated FW component	-109.5	-28.6	-74.6	-131.5	-46.6	-72.6	-66.0	-107.0	-29.8	-72.9	-72.9

	City of Redmond	April	May	June	July	August	September	October	November	December	Average	Avg. Month
1	2001 Citywide Yard Debris	117.5	183.2	137.5	126.9	101.1	93.1	115.8	155.7	47.3	119.8	119.8
2	2002 Citywide Yard Debris	165.2	199.6	173.3	140.0	92.7	78.5	98.7	145.8	51.3	127.2	127.2
	2003 Citywide Yard Debris											
3	Annual Variation Coefficient (2)/(1):	1.406	1.090	1.261	1.103	0.917	0.843	0.852	0.936	1.085	1.06	1.06
4	2001 Pilot Route Yard Debris	n/a	190.4	189.5	128.4	120.8	147.8	97.9	89.2	59.4	127.9	127.9
5	2002 Pilot Route YD+FW (RT 691)	189.3	216.4	222.9	143.4	89.0	95.3	95.8	158.2	128.2	148.7	148.7
	2003 Pilot Route YD+FW (RT 691)											
6	2001 Citywide SF Garbage	132.0	146.7	146.8	143.6	147.6	133.2	146.7	141.3	123.6	140.2	140.2
7	2002 Citywide SF Garbage	133.5	137.6	125.3	149.2	133.6	132.8	132.5	120.2	143.6	134.3	134.3
	2003 Citywide SF Garbage											
8	Annual Variation Coefficient (7)/(6):	1.011	0.937	0.853	1.039	0.905	0.997	0.904	0.851	1.162	0.96	0.96
9	2001 Pilot Route Garbage	n/a	126.3	129.8	151.8	138.4	142.7	133.6	128.3	133.1	135.5	135.5
10	2002 Pilot Route Garbage (RT305)	112.2	114.6	123.0	122.7	130.2	125.8	113.0	118.6	114.9	119.5	119.5
	2003 Pilot Route Garbage (RT305)											
11	Pilot: Calculated YD component	n/a	207.5	238.8	141.6	110.8	124.6	83.5	83.5	64.4	135.9	135.9
12	Pilot: Calculated FW component	n/a	8.9	-15.9	1.8	-21.8	-29.3	12.3	74.7	63.8	12.9	12.9